

CATALYSIS FOR RENEWABLE ENERGY

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Renewable energy comes as electricity termed RES. It allows reducing the primary energy consumption of non-sustainable fossil energy systems by the losses of combustion in power stations summarizing to about 30% of the total energy content of a conventional system. There is more than sufficient RES on the planet but it comes at the wrong place and the wrong time. So, storing and transport is a critical issue [1] that seems sometimes disregarded as a fundamental issue. The presentation shows the systemic and dimensional challenges.

The solution is CEC [2] (chemical energy conversion) of electricity to hydrogen and its derivatives. From there all energy and material needs can be satisfied allowing to defossilize the energy systems. A critical first step is water splitting by electrolysis followed, however, by interfacial catalysis [3] providing at global scale and cost the derivatives of hydrogen. The presentation addresses some current challenges and touches on our understanding of interfacial catalysis as basis to estimate the current state of affairs.

1. Schlögl, R., *Put the Sun in the Tank: Future Developments in Sustainable Energy Systems*. *Angew. Chem. Int. Ed.*, 2019. **58**(1): p. 343-348.
2. Schlögl, R., *Chemical energy storage enables the transformation of fossil energy systems to sustainability*. *Green Chem.*, 2021. **23**(4): p. 1584-1593.
3. Schlögl, R., *Chemische Batterien mit CO₂*. *Angew. Chem. Int. Ed.*, 2021. **60**: p. 2-25.